UNITED STATES PATENT APPLICATION

FOR

# A METHOD AND SYSTEM FOR IMPLEMENTING LOCATION AWARE INFORMATION ACCESS AND RETRIEVAL IN A WIRELESS PORTAL SERVER

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# A METHOD AND SYSTEM FOR IMPLEMENTING LOCATION AWARE INFORMATION ACCESS AND RETRIEVAL IN A WIRELESS PORTAL SERVER

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This application is related to the following copending and commonly assigned U.S. Patent Applications:

15 "EXTENSIBLE CLIENT AWARE DETECTION IN A WIRELESS PORTAL SYSTEM", Serial No. 09/929,477, filed on 8/13/01;

"CLIENT AWARE AUTHENTICATION IN A WIRELESS PORTAL SYSTEM", Serial No. 09/929,476, filed on 8/13/01;

"EXTENSIBLE CLIENT AWARE HIERARCHICAL FILE MANAGEMENT
20 IN A WIRELESS PORTAL SYSTEM", Serial No. 09/929,743, filed on 8/13/01;

"CLIENT AWARE CONTENT SELECTION AND RETRIEVAL IN A WIRELESS PORTAL SYSTEM", Serial No. 09/929,654, filed on 8/13/01;

"CLIENT AWARE CONTENT SCRAPING AND AGGREGATION IN A WIRELESS PORTAL SYSTEM", Serial No. 09/929,545, filed on 8/13/01; and

25 "CLIENT AWARE EXTENSIBLE MARKUP LANGUAGE CONTENT RETRIEVAL AND INTEGRATION IN A WIRELESS PORTAL SYSTEM", Serial No. 09/929,802, filed on 8/13/01. The above recited U.S. Patent Applications are incorporated herein in their entirety.

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## 5  TECHNICAL FIELD

The present invention relates generally to methods and systems for implementing location based mapping functionality for client devices. More specifically, the present invention pertains to a method and system for implementing location aware information access and retrieval in a wireless

10  portal server.

## BACKGROUND ART

The use of Web portals has become widespread for obtaining information, news, entertainment, and the like, via the World Wide Web. A

15  Web portal is generally a Web "supersite" that provides a variety of services including Web searching, news, white and yellow pages directories, free e-mail, discussion groups, online shopping and links to other sites. The Web portal term is generally used to refer to general purpose sites, however, it is increasingly being used to refer to vertical market sites that offer the same

20  services, but only to a particular industry such as banking, insurance or computers, or fulfill specific needs for certain types of users, for example, business travelers who are often away from their office or their primary point of business.

25  Certain types of Web portals have evolved into customized, user type specific sources of information. One example would be a corporate Web site, wherein an internal Web site (intranet) provides proprietary, enterprise-wide information to company employees as well as access to selected public Web sites and vertical-market Web sites (suppliers, vendors, etc.). Such a Web site

30  would typically include a customized search engine for internal documents as well as the ability to customize the portal page for different user groups and

5      individuals. Access to such customizable Web sites by business travelers, or

other types of users who require concise prompt access to information, is a

highly sought-after goal.


Yellow pages directory types of information and mapping types of

10     information are also very helpful for mobile users. For example, for a mobile

user (e.g., business traveler), it would be very advantageous to obtain wireless

access to a Web portal capable of providing yellow pages functionality and or

location based mapping (e.g., street level maps) functionality. Additionally, it

would be advantageous if such functionality could be obtained via a portable

15     handheld device, such as a cellphone or a wireless PDA. However, presentation

of information on the small screens typical with such portable handheld

devices requires customization of the Web portal and the formatting of the

data it provides.


20     Standards have been developed to provide a widely used method of

formatting data for the smaller screens of portable handheld devices. One such

standard is WML (Wireless Markup Language). WML is a tag-based language

used in the Wireless Application Protocol (WAP). WML is an XML document

type allowing standard XML and HTML tools to be used to develop WML

25     applications. WAP is a standard for providing cellular phones, pagers and

other handheld devices with secure access to e-mail and text-based Web pages.

WAP provides a complete environment for wireless applications that includes

a wireless counterpart of TCP/IP and a framework for telephony integration

such as call control and phone book access. WAP features the Wireless

30     Markup Language (WML) and is a streamlined version of HTML for small

screen displays. It also uses WMLScript, a compact JavaScript-like language

5    that runs in limited memory. WAP is designed to run over all the major

wireless networks in place now and in the future.


       Although tools are in place (e.g., wirelessly connected portable handheld

devices, WML and WAP based communications standards, customized Web

10   portals, etc.) to provide customized, application specific, information to

business travelers and other various types of users via portable handheld

devices, existing prior art applications and methods are still generally targeted

towards the mass market. The number of individually customized and tailored

information delivery mechanisms is limited. For example, although a custom

15   Web site or Web portal might be directed towards business travelers (e.g.,

presenting restaurant and hotel information, yellow pages, car rental and

airline flight information, etc.) the amount of information which can be

configured for and delivered to a specific business traveler is limited. A user in

a particular city (e.g., by entering location into a user interface of the device)

20   can be presented with information that any other user in such a particular city

would be presented with. Specifically, location specific information is not

customized and is not presented automatically to individual users.


       Thus, what is required is a solution that can customize information

25   presented from a Web site or a Web portal with respect to an individual user

and his location. The required solution should automatically format the

information in accordance with WML and WAP communication standards. In

addition, the required solution should automatically incorporate individual

specific location information with respect to other types of information which

30   may be retrieved by a user. The present invention provides a novel solution to

the above requirements.

5 DISCLOSURE OF THE INVENTION

The present invention provides a solution that can customize information presented from a Web site or a Web portal with respect to an individual user. The present invention automatically formats the information in accordance with WML and WAP communication standards. In addition, the

10 present invention automatically incorporates individual specific location information with respect to other types of information which may be retrieved by a user.

In one embodiment, the present invention is implemented as a method

15 for using user location information to customize information in a Web portal. The method is implemented within a client/server framework. The method includes the steps of receiving user location information from a user, receiving a request for application specific information from the user, selecting pertinent application specific information based on the user location information, and

20 transmitting the pertinent application specific information to the user.

The client device can be a portable handheld device such as a cellular phone or a wirelessly connected PDA (personal digital assistant). Communication can be established in accordance with a number of different

25 standards. For example, in one embodiment, the user location information can be received in accordance with WAP (wireless application protocol) communication standards. Other communication standards can be used (e.g., iMode, cHTML, etc.). The user location information can be, for example, a current address, a zip code, or geographical coordinates of the user.

30 Application specific information of the user can be, for example, calendar information, and the pertinent application specific information can be, for

5      example, information regarding the location of calendar events with respect to the user location. Similarly, application specific information can be hotel information, and the pertinent application specific information can be information regarding the location of hotels with respect to the user location. Additional examples include the application specific information of the user

10     being appointment information for the user, and the pertinent application specific information being information regarding the location of appointments with respect to the user location. Applications can include, for example, a yellow pages function where user location can be used to fetch various points of interest around the area (such as ATMs, gas stations, etc.), a map function

15     where user location can be used to generate a map specific to that location, and the like.

        The user location information can be associated with a location name, wherein the user selects a particular location by selecting a particular location

20     name from a menu of location names presented by a portable handheld device. The present invention is also compatible with modern location fixing mechanisms, such as GPS (global positioning system). The use of WML and WAP standards ensures compatibility with a variety of different types of portable handheld devices such as cellphones, wirelessly connected PDAs,

25     palmtop computer systems, and the like. In this manner, the present invention automatically incorporates individual specific location information with respect to other types of information which may be retrieved by a user, and present such information in a manner specific to the individual circumstances of a particular user.

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## 5   BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are incorporated in and form a part of this specification, illustrate embodiments of the invention and, together with the description, serve to explain the principles of the invention:

10       Figure 1 shows a client/server computer system in accordance with one embodiment of the present invention.

Figure 2 shows a flowchart of the steps of a user location application customization process in accordance with one embodiment of the present

15      invention.

Figure 3 shows a diagram depicting one implementation of the internal software components of a server used to implement the location awareness functionality in accordance with one embodiment of the present invention.

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Figure 4 shows a map channel, a calendar channel, and a Yellow Pages channel as implemented by a server in accordance with one embodiment of the present invention.

25      Figure 5 shows a diagram of a computer system platform in accordance with one embodiment of the present invention.

5    DETAILED DESCRIPTION OF THE INVENTION

Reference will now be made in detail to the embodiments of the invention, a method for using user location information to customize information retrieved via a server, examples of which are illustrated in the accompanying drawings. While the invention will be described in conjunction

10    with the preferred embodiments, it will be understood that they are not intended to limit the invention to these embodiments. On the contrary, the invention is intended to cover alternatives, modifications and equivalents, which may be included within the spirit and scope of the invention as defined by the appended claims. Furthermore, in the following detailed description of the

15    present invention, numerous specific details are set forth in order to provide a thorough understanding of the present invention. However, it will be obvious to one of ordinary skill in the art that the present invention may be practiced without these specific details. In other instances, well known methods, procedures, components, and circuits have not been described in detail as not

20    to unnecessarily obscure aspects of the present invention.

Embodiments of the present invention are directed towards a method for using user location information to customize information in a Web portal, as implemented within a client/server framework. The present invention provides

25    a solution that can customize information presented from a Web site or a Web portal with respect to an individual user. The present invention automatically formats the information in accordance with different communication standards (e.g., WML, WAP, etc.). In addition, the present invention automatically incorporates individual specific location information with respect to other types

30    of information which may be retrieved by a user.

5   Notation and nomenclature

Some portions of the detailed descriptions which follow are presented in terms of procedures, steps, logic blocks, processing, and other symbolic representations of operations on data bits within a computer memory. These descriptions and representations are the means used by those skilled in the

10   data processing arts to convey most effectively the substance of their work to others skilled in the art. A procedure, computer executed step, logic block, process, etc., are here, and generally, conceived to be self-consistent sequences of steps or instructions leading to a desired result. The steps are those requiring physical manipulations of physical quantities. Usually, though not

15   necessarily, these quantities take the form of electrical or magnetic signals capable of being stored, transferred, combined, compared, and otherwise manipulated in a computer system. It has proven convenient at times, principally for reasons of common usage, to refer to these signals as bits, values, elements, symbols, characters, terms, numbers, or the like.

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It should be borne in mind, however, that all of these and similar terms are to be associated with the appropriate physical quantities and are merely convenient labels applied to these quantities. Unless specifically stated otherwise as apparent from the following discussions, it is appreciated that

25   throughout the present invention, discussions utilizing terms such as "processing," "examining," "accessing," "routing," "determining," "transmitting," –storing," or the like, refer to the action and processes of a computer system, or similar electronic computing device, that manipulates and transforms data represented as physical (electronic) quantities within the

30   computer system's registers and memories into other data similarly

5      represented as physical quantities within the computer system registers or

memories or other such information storage, transmission, or display devices.

Figure 1 shows a diagram of a client/server system 100 in accordance

with one embodiment of the present invention. System 100 depicts a server

10     101 communicating with a client 102 via a distributed computer network 110,

in this case the Internet.

Figure 1 depicts the basic structure of the present invention, wherein a

server 101 is used to retrieve specific pertinent information for one or more

15     clients (e.g., client 102), and present the information in the most efficient

manner possible. In this embodiment, server 101 is used to implement a Web

portal, for serving information, news, entertainment, and the like, via the

Internet 110 (e.g., the World Wide Web). As such, server 101 is configured to

provide a variety of services including Web searching, news, white and yellow

20     pages directories, free e-mail, discussion groups, online shopping and links to

other sites. In one embodiment, server 101 can be used to implement a

specifically tailored Web site that offers the specific, particular industry

services, such as banking, insurance or computers, or fulfill specific needs for

certain types of users, for example, business travelers who are often away

25     from their office or their primary point of business.

Web server 101 can be configured to provide information formatted

specifically for a mobile user (e.g., business traveler), thereby providing

wireless access to Web portal functions via a portable handheld device, such as

30     a cellphone or a wireless PDA (e.g., client 102). Accordingly, Web server 101 is

compatible with widely used communication standards (e.g., WML, WAP,

5      iMode, etc.) for formatting data for the smaller screens of portable handheld

devices.

Figure 2 shows a flowchart of the steps of a user location application

customization process 200 in accordance with one embodiment of the present

10     invention. Process 200 depicts the steps as performed by a server (e.g., server

101) in providing customized user specific information to a user via the user's

portable handheld client device in response to user requests.

Process 200 begins in step 201, where communication between a

15     portable client device (e.g., a cellphone) and a server is established via the

Internet. In step 202, server 101 receives user location information from the

user. The client device can be a portable handheld device such as a cellular

phone or a wirelessly connected PDA. The user location information can be

received in accordance with WAP communication standards. The user location

20     information can be a current address, can be a zip code, or can be geographical

coordinates of the user. Such information can be entered into the portable

handheld device via the device's graphical user interface, or other such means

(e.g., graffiti input, menu selection, etc.). The user location information can be

associated with a location name, wherein the user selects a particular location

25     by selecting a particular location name from a menu of location names

presented by a portable handheld device. The present invention is also

compatible with modern location fixing mechanisms, such as GPS (global

positioning system).

30     In step 203, the request for application-specific information is received

from the user. Subsequently, in step 204 pertinent application-specific

5    information is selected based upon the user location information. Application

specific information of the user can be calendar information and the pertinent

application specific information can be information regarding the location of

calendar events with respect to the user's location. Similarly, application

specific information can be hotel information, and the pertinent application

10   specific information can be information regarding the location of hotels with

respect to the user's location. Additional examples include the application

specific information of the user being appointment information for the user,

and the pertinent application specific information being information regarding

the location of appointments with respect to the user location. Similarly,

15   application-specific information can be any type of information a user would

require from, for example, a "Yellow Pages" application, wherein the location

information is used to present choices to points of interest (e.g., ATM, Bank,

Post Office, etc.) to the user based upon their distance from the user's present

location.

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In step 205, the pertinent application-specific information is

transmitted to the user. The pertinent application specific information can be

transmitted to the user in accordance with different communication protocol

standards and/or markup languages. The compatibility with the different

25   communication standards ensures compatibility with a variety of different

types of portable handheld devices such as cellphones, wirelessly connected

PDAs, palmtop computer systems, and the like.


In this manner, the present invention automatically incorporates

30   individual specific location information with respect to other types of

5    information which may be retrieved by a user, and present some in a manner

specific to the individual requirements of a particular user.


Figure 3 shows a diagram depicting one implementation of the internal

software components of server 101 used to implement the location awareness

10   functionality of the present invention. A server 101 includes a profile server

301 which stores user specific information, for example, regarding the types of

information the user would be interested in. The profile server 301 interacts

with a plurality of channels 310. The channels store user preferences and

implement specific functionality. For example, mapping functions are provided

15   by a mapping channel, calendar functions are provided by a calendar channel,

Yellow Pages functions are provided by a Yellow Pages channel, and the like.

Data for the server 101 is stored within a database 320. The profile server 301

in the channels 310 access data from database 320.


20   Server 101 is configured to provide information to the user in both

HTML formats (e.g., desktop client info 330) and portable handheld device

formats (e.g., WML client info 340). Accordingly, the user client (e.g., user

client 102 of figure 1) can be either a desktop computer system or a portable

handheld device.

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Figure 4 shows a map channel 311, a calendar channel 312, and a

Yellow Pages channel 313. In the present embodiment, the user defined

location will be stored by the profile server 301. A user can define addresses for

multiple locations like Home, Work, Friends place, etc., and the particular

30   channel will prompt the user with a pull down menu for his possible locations

when doing, for example, a Yellow Pages lookup or for the driving directions.

5      This functionality is diagrammed in Figure 4. User location information 402 is

received from the client in the manner described above. Using this location

information, map channel 311 interacts with the other channels (e.g., calendar

channel 312, Yellow Pages channel 313, and others) to retrieve location aware,

location pertinent, application-specific information (referred to herein as

10     pertinent application-specific information) as described in step 204 of process

200 above.


It should be noted that the multiple channels 310 are preferably written

in a server independent manner so as to avoid a rewrite if a change in a

15     location server is required. Additionally, the channels 310 are preferably

written in Java in order to use standardized APIs defined in Java.


In one embodiment, the user interface will present a pull down menu of

his locations configured and a text input field where the user can type in the

20     name of the business he/she is interested in. If the user does not have any

location configured, the search will center around, for example, a default zip

code.


Examples of pertinent application-specific information 401 are now

25     described. In a case where the user queries server 101 for certain types of

businesses (e.g., car repair shops), the pertinent application-specific

information 401 will be a list of hyperlinked businesses (e.g., car repair shops)

found (with the link taking them to a map), the distance, the city found in, and

the phone number. In order to make more efficient use of the smaller screen of

30     a portable handheld device, the WML based pertinent application-specific

5      information will be a list of hyperlinked businesses (with the link pointing to the

driving directions in text), distance, city and the phone number.


With regard to map channel 311, the user interface can have a pull

down menu of his configured locations and a text input field where he can enter

10     the address he is interested in.  For example, if the user does not have any

location configured, the default zip code will be mapped.  To get driving

directions, the user has to select from the pre-configured locations (the pull

down menu) and enter an address in the text field.  For desktop computer

systems, the pertinent application-specific information output will be a map

15     showing directions, while in a portable handheld device, the output can be

directions in text.


## Computer system environment

Referring to Figure 5, a computer system 512 is illustrated.  Within the

20     following discussions of the present invention, certain processes and steps are

discussed that are realized, in one embodiment, as a series of instructions (e.g.,

software program) that reside within computer readable memory units of system

512 and executed by processors of system 512.  When executed, the instructions

cause computer system 512 to perform specific actions and exhibit specific

25     behavior which was described in detail above.


Specific aspects of the present invention are operable within a programmed

computer system which can function as a client or server machine.  A generalized

example of such a computer system operable to implement the elements of the

30     present invention is shown in Figure 5.  In general, the computer system of the

present invention includes an address/data bus 500 for communicating

5      information, one or more central processor(s) 501 coupled with bus 500 for

processing information and instructions, a computer readable volatile memory unit

502 (e.g., random access memory, static RAM, dynamic RAM, etc.) coupled with

bus 500 for storing information and instructions for the central processor(s) 501, a

computer readable non-volatile memory unit 503 (e.g., read only memory,

10     programmable ROM, flash memory, EPROM, EEPROM, etc.) coupled with bus

500 for storing static information and instructions for processor(s) 501. System

512 can optionally include a mass storage computer readable data storage device

504, such as a magnetic or optical disk and disk drive coupled with bus 500 for

storing information and instructions. Optionally, system 512 can also include a

15     display device 505 coupled to bus 500 for displaying information to the computer

user, an alphanumeric input device 506 including alphanumeric and function keys

coupled to bus 500 for communicating information and command selections to

central processor(s) 501, a cursor control device 507 coupled to bus for

communicating user input information and command selections to the central

20     processor(s) 501, and a signal input/output device 508 coupled to the bus 500 for

communicating messages, command selections, data, etc., to and from

processor(s) 501.


        The foregoing descriptions of specific embodiments of the present

25     invention have been presented for purposes of illustration and description.

They are not intended to be exhaustive or to limit the invention to the precise

forms disclosed, and obviously many modifications and variations are possible

in light of the above teaching. The embodiments were chosen and described in

order best to explain the principles of the invention and its practical

30     application, thereby to enable others skilled in the art to best utilize the

invention and various embodiments with various modifications as are suited to

5    the particular use contemplated.  It is intended that the scope of the invention

be defined by the Claims appended hereto and their equivalents.